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SOME NOTES ON ENGLISH MORPHOPHONEMICS.

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THE RELATION IS EXAMINED BETWEEN SIMPLE VOWEL SOUNDS IN ENGLISH AND VOWELS ASSOCIATED WITH GLIDES, OR SEMIVOWELS, SOMETIMES REFERRED TO AS "COMPOUND PHONEMES." THESE COMPLEX VOWEL NUCLEI PARTICIPATE IN MORPHOPHONEMIC ALTERNATIONS WITH SIMPLE VOWEL NUCLEI, AS FOR EXAMPLE, IN THE ALTERNATION OF VOWEL NUCLEI IN THE PAIR "SLEEP/SLEPT." THE SYSTEM UNDERLYING SUCH REGULAR ALTERNATIONS IS DESCRIBED AND RULES ARE GIVEN TO ACCOUNT FOR THE PHONETIC SHAPES OF THE ALTERNATIONS. THE DEVELOPMENT OF SUCH A SYSTEM RESTS ON THE ASSUMPTIONS THAT (1) FORMS PHONETICALLY DIFFERENT BUT MORPHOPHONEMICALLY RELATED ARE BASED ON THE SAME UNDERLYING FORM, AND (2) THE UNDERLYING SYSTEM COULD BE EVALUATED BY CONSIDERATIONS OF OPTIMAL SIMPLICITY IN THE SYSTEM AS WELL AS IN THE RULES FOR DERIVATION OF SUPERFICIAL PHONETIC SHAPES FROM UNDERLYING MORPHOPHONEMIC SHAPES. ENGLISH COMPLEX AND SIMPLE VOWEL NUCLEI ARE CLASSIFIED IN TERMS OF DISTINCTIVE FEATURES AND THE TWO SETS ARE DISTINGUISHED BY THE FEATURE OF TENSENESS VERSUS LAXNESS IN THE VOWELS UNDERLYING THE NUCLEI. THESE RULES ACCOUNT SYNCHRONICALLY FOR PHENOMENA WHICH ARE THE RESULTS OF THE SO-CALLED "GREAT VOWEL SHIFT" AND CAN BE ACCOUNTED FOR SYNCHRONICALLY BY ONE RULE FOR THE TENSE VOWELS AND ANOTHER FOR THE LAX VOWELS. (KL)

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Some Notes on English Vowel Morphophonemics[1]

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English vowel phonology has fascinated linguists for some time. Especially fascinating has been the question of the relation between the simple vowel sounds of English and those vowels associated with glides, or semivowels. The vowel and semivowel combinations have been recognized as having some special status that other combinations of English phonemes do not. Bloomfield refers to these combinations as "compound phonemes."

> Compound phonemes are combinations of simple phonemes which act as units so far as meaning and word structure are concerned. Thus, the diphthong in a word like buy can be viewed as a combination of the vowel in far with the phoneme that is initial in yes. Standard English has eight such combinations. (Bloomfield 1933: 90)

These combinations, for Bloomfield (1933: 91), are:

[aj]	buy	[baj]	[ij]	bee	[bij]	[ɔj]	boy	[bɔj]
[aw]	bough	[baw]	[juw]	few	[fjuw]	[uw]	do	[duw]
[ej]	bay	[bej]	[ow]	go	[gow]			

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I have been unable to find where Bloomfield justifies his taking these particular combinations, and no others of his list of English phonemes, as having the special status of "compound phonemes." Yet, we know that Bloomfield, and others who have concerned themselves with the problem of English vowel nuclei, are not wrong, inasmuch as these vowel nuclei -- and not other sequences, as, for example, [wīy] as in queen, or [i̯w] as in away -- are units in some sense. This paper explores the question of how these vowel nuclei can properly be taken as units, or single segments.

These complex vowel nuclei, or "compound phonemes," just mentioned, participate in morphophonemic alternations with simple vowel nuclei, but in a quite unobvious way, from a phonetic point of view, such that [Īy] alternates with [ĕ], as in the pair sleep : slept ; [āy] alternates with [ĭ], as in bite : bit ; [ēy] alternates with [ăe], as in bathe : bath ; [ūw] alternates with [ŭ], as in hooves : hoof ; [yūw] alternates with [ŏ], as in assume : assumption (with or without a later deletion of the y after alveolar consonants) ; [āw] also alternates with [ŏ], as in south : southern ; and [ōw] alternates with [ă], as in phone : phonic. [ōy] seems to be a left-

over. There are some morphophonemic alternations involving [ɔ̄y], such as in the pairs destroy : destruction, conjoin : conjunction, point : punctual, but the details are not worked out here. Neither have the details of the status of [ɔ̄ᵊ], as in law or caught, been worked out. Neither [ɔ̄y] nor [ɔ̄ᵊ] figure in the following discussion.

There are other vowel alternations in English that are not dealt with here either. The most obvious of these are those alternations which are relics of Indo-European ablaut, such as in the paradigms drive : drove : driven, sing : sang : sung, or of Germanic umlaut, such as in the pairs man : men, goose : geese, mouse : mice. Such alternations have to be accounted for in some way in a general grammar of English, but are not treated here.

The concern here is with the vowel system underlying the "regular" alternations cited above, and to provide rules accounting for the actually occurring phonetic shapes.

Before dealing with the question of what the nature of the underlying vowel system of English seems to be like, some assumptions about setting up such a system must be mentioned.

The first assumption is that forms that are phonetically different but morphophonemically related are based on the same underlying form. (And conversely, forms that cannot be based on the same underlying form cannot be said to be morphophonemically related.)

The second assumption is that the underlying system is evaluated by considerations of what makes for the simplest underlying system and the simplest set of rules to derive the superficial phonetic shapes from the underlying morphophonemic shapes.

Now to consider the nature of the system underlying English vowel nuclei:

It seems that the English complex vowel nuclei can be divided into two (overlapping) groups: those with a glide (or modification) in the high front area -- [Īy, āy, ēy, yūw] -- and those with a glide (or modification) in the high back area -- [ūw, yūw, āw, ōw].

If the common possession of the high back modification of this last set is taken as indicative of one of the features of the underlying system -- and the obvious choice (in the Jakobsonian distinctive feature framework) is Flatness, that is, rounding -- then we can say that the underlying forms of [ūw, yūw, āw, ōw] differ from those underlying [Iy, āy, ēy] as being Flat, or rounded, as opposed to non-Flat, or unrounded.

On the other hand, a modification in the high front area can be taken as evidence of Acuteness, that is, for vowels, frontness. Thus, the underlying forms of [Iy, āy, ēy, yūw] are Acute, or front, as opposed to those underlying [ūw, āw, ōw], which are non-Acute, or non-front.

Except for the vowel underlying [yūw] -- which is Acute as opposed to the non-Acute vowel underlying [ūw], Acuteness turns out to be redundant, that is, Acuteness is predictable for all the other vowels from the Flatness feature : vowels that are Flat are non-Acute, and vice versa. Consequently, the only vowel that must be specified as Acute is that underlying [yūw].

This much can be determined on the basis of the complex nuclei alone.

Now, looking at the simple nuclei, we find that these vowels are distributed in three heights : the high vowels [ĭ, ŭ], the mid vowels [ĕ, ŏ], and the low vowels [æ̆, ă]. Further, they are distributed as front [ĭ, ĕ, æ̆] versus non-front [ŭ, ŏ, ă].

The non-front vowels present somewhat of a problem because [ŏ] participates in two different morphophonemic alternations : one where it alternates with [āw], as in abundant : abound, and the other where it alternates with [yūw] (or at times simply [ūw]), as in consumption : consume. Thus, we look to the front vowels first in the attempt to characterize the underlying system.

If the vowel underlying [ĭ] is characterized as Diffuse, or high, the vowel underlying [æ̆] as Compact, or low, and that underlying [ĕ] as non-Diffuse and non-Compact, that is, neither high nor low, then by noting the nature of the alternations that these vowels participate in, the non-front vowels fall into place.

That is, if the vowel underlying [ĭ ~ āy] is Diffuse, then so must be that underlying [ă ~ āw]; if the vowel underlying [æ̆ ~ ēy] is Compact, then so must be that underlying [ă ~ ōw]; and if the vowel underlying the alternation of [ĕ] with a complex Diffuse nucleus [Iy] is non-Diffuse and non-Compact, then considering that the alternations [ŭ ~ ūw] and [ă ~ yūw] both involve complex nuclei which are likewise Diffuse, the vowels underlying these alternations must also be non-Diffuse and non-Compact.

Now we have an underlying vowel system except for that feature which distinguishes the vowels underlying the complex nuclei from those underlying the simple nuclei. I have chosen the feature Tense to mark this difference, as in Figure I. This particular feature is chosen because all the vowel nuclei under consideration here involve segments which are usually treated as allophonically tense before a following semivowel and lax, or non-Tense, when not so followed. (It should be noted in Figure I that the semivowel y is specified only as Segment and w is specified only as Segment and Flat. The suggestion to add a row to be called Segment to the list of features is attributed to Morris Halle (Wilson 1966: 201).)

y	w	é	ē	ĭ	Ī	ă	ā	ó	ō	ø	ø̄	ŭ	ū	ŏ	ō	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	Segment
		+	+	+	+	+	+	+	+	+	+	+	+	+	+	Vocalic
																Consonantal
	+							+	+	+	+	+	+	+	+	Flat
						+	+							+	+	Compact
				+	+							+	+			Diffuse
										+	+					Acute
			+		+		+		+		+		+		+	Tense

Figure I

In the present analysis, the Tenseness of the vowels of the complex nuclei is not attributed to the influence of the following semivowel but to the underlying system. (And, as will be seen below, the presence of a following semivowel is attributed to Tenseness.)

Granting the marking of vowel segments in the underlying system as appropriately Tense or non-Tense (and this paper is not concerned with how the vowels get marked for Tenseness), then we can procede to the rules that account for the superficial forms.

Rule (1), given in Figure II[2], has to be qualified by the statement that any segment that is Compact is necessarily non-Diffuse, that is, no vowel can be both

(1)

Segment	+				δ	+	+		
Vocalic	+					+			
Consonantal									
Flat	α						α		
Compact	β	-->				ι			
Diffuse	γ					β̄			
Acute	δ								
Tense	+					+			

Figure II

high and low. Thus, if Compact is plus for any segment, Diffuse for the same segment must be zero.

Rule (1) changes ē to Iy, Ī to āy, ā to ēy, ō to Iw, ǭ to yIw, ū to āw, and ō̄ to ēw, as can be seen in Figure III. All of the nuclei generated by Rule (1)

	ē --> I y				Ī --> ā y				ā --> ē y				ō --> I w			
Segment	+		+	+	+		+	+	+		+	+	+		+	+
Vocalic	+		+		+		+		+		+		+		+	
Consonantal																
Flat		-->				-->				-->			+	-->		+
Compact							+		+							
Diffuse			+		+										+	
Acute																
Tense	+		+		+		+		+		+		+		+	

Figure III (continued next page)

	ø	-->	y	ɪ	w	ū	-->	ā	w	ō	-->	ē	w
Segment	+		+	+	+	+		+	+	+		+	+
Vocalic	+			+		+		+		+		+	
Consonantal													
Flat	+				+	+			+	+			+
Compact		-->					-->	+		+	-->		
Diffuse				+		+							
Acute	+												
Tense	+			+		+		+		+		+	

Figure III (continuation)

involve vowels which are non-Flat, non-Acute, non-Grave, that is, unrounded central vowels. For most dialects of English there will have to be later adjustments such that most vowels assimilate in certain respects to the following semivowels.

It should be noted that in some dialects, notably in certain varieties of Australian English, all non-Compact complex vowel nuclei begin with unrounded central vowels. In this particular respect, such dialects would be by the present analysis closer in their phonetics to the underlying system than would be other dialects, where non-Compact vowels are made Acute before y and Flat before w.

Rule (1) states, essentially, that underlying Tense vowels are realized as superficial vowel nuclei with a following semivowel which is Flat (rounded) or not (that is, a following semivowel that is respectively w or y) depending on whether the underlying vowel is Flat or not ; that underlying low vowels are realized as non-high vowels (whatever the sign for Compactness is for the underlying vowel, the opposite is the sign for Diffuseness for the superficial vowel) ; that underlying high vowels are realized as low vowels (that is, the underlying sign for Diffuseness is shifted to be the superficial sign for Compactness) ; that an underlying Acute Tense vowel is realized as a Tense vowel with a non-Flat semivowel preceding. Tenseness remains. It should be noted that the only Tense vowel that is Acute is the vowel underlying the triphthong [yūw]. Consequently, this is the only vowel nucleus with a semivocalic on-glide.

The remainder of the rules to be discussed here have to do with the assignment of the correct features to the non-Tense vowels.

Rule (2) specifies the three non-Flat non-Tense vowels as Acute, changing ĕ, ĭ, ă into front vowels

(2)				
	Vocalic	+		+
	Consonantal			
	Flat		-->	
	Acute			+
	Tense			

Figure IV

(fronted ă to be symbolized ă̲) as can be seen in Figure V.[3]

	ĕ --> ĕ			ĭ --> ĭ			ă --> ă̲		
Segment	+		+	+		+	+		+
Vocalic	+		+	+		+	+		+
Consonantal									
Flat									
		-->			-->			-->	
Compact							+		+
Diffuse				+		+			
Acute			+			+			+
Tense									

Figure V

Rule (3) specifies that of the underlying non-Tense vowels only those having the same sign for Diffuseness and Acuteness are Diffuse and that underlying Flat non-Tense vowels are realized as superficial non-Acute vowels, as can be seen in Figure VII.

(3)

Vocalic	+		+
Consonantal			
Flat	α		
Diffuse	β	-->	δ
Acute	γ		$\overline{\alpha}$
Tense			

where δ = + only if $\alpha = \beta$.

Figure VI

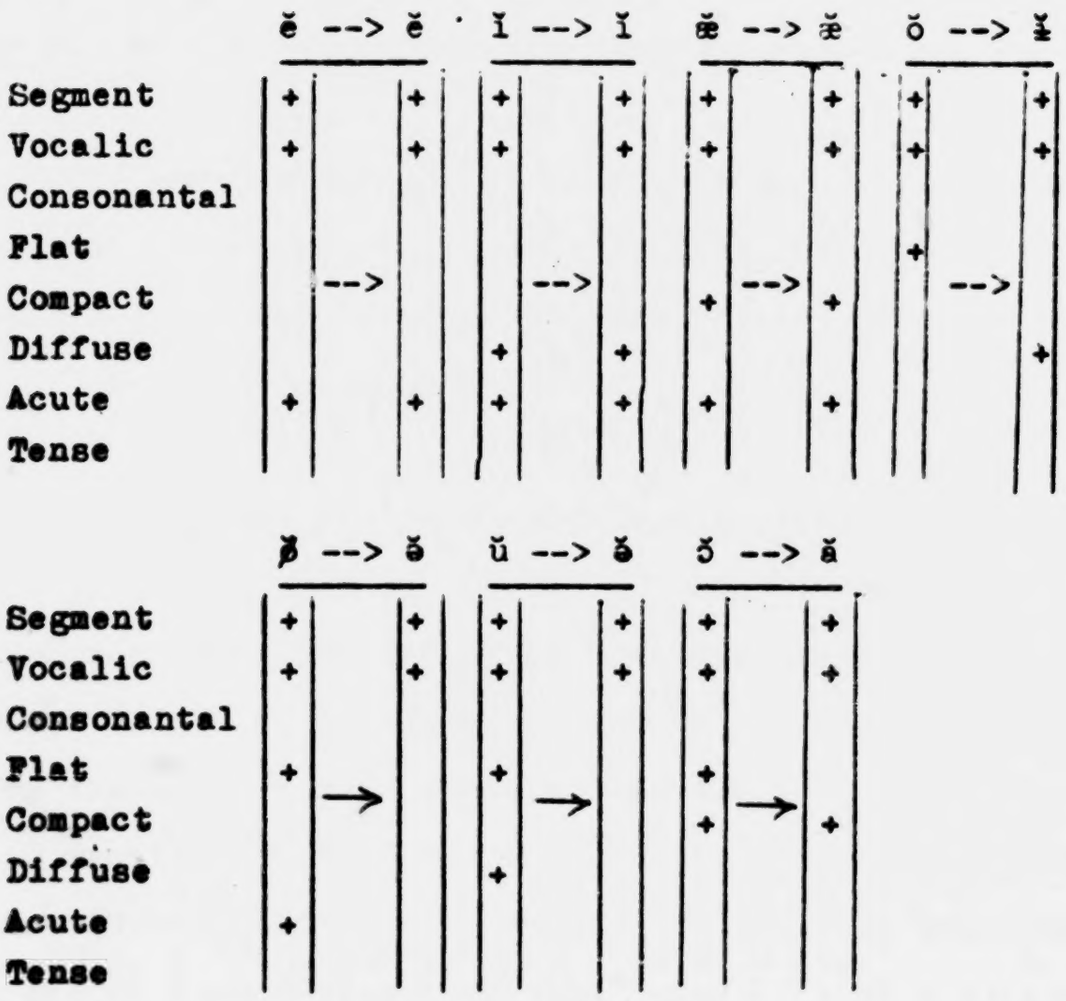

Figure VII

There will have to be later rules, their details depending on the dialect, to account for facts such as the deletion of the on-glide portion of yīw in certain positions, as after alveolar consonants for most Americans ; the rounding of the higher non-Acute vowels, giving ūw for īw, as in boot, and ŭ for underlying ɨ̆, as in good ; various reductions of vowel nuclei before r ; reductions of vowels in unstressed positions ; and so on until all features are properly specified.

It must be emphasized that this is a synchronic analysis : granted the phonetic facts, what underlying system is in accord with the simplest set of rules that can relate those phonetic facts.

Historically, the phenomena discussed in this paper are the results of the so-called Great Vowel Shift. Synchronically, it seems that the results of the Great Vowel Shift can be accounted for by one rule (Rule (1)) for the tense vowels and one rule (Rule (3)) for the lax vowels. This is not intended to suggest that the Great Vowel Shift took place historically in this way. I see no reason to abandon the point of view that modifications of a language usually happen one feature at

at a time, with subsequent simplification of the rules, with the result that the phonological rules of a language do not necessarily match neatly the historical stages the language has gone through.

Footnotes

1. An earlier version of this paper, with the somewhat shorter title "Some notes on English morphophonemics," was read on December 29, 1966, to the Linguistic Society of America, meeting in New York.

2. Rule (1) could equally well be broken down into the following three rules:

(1a)

Segment	+		+ +
Vocalic	+		+
Consonantal		-->	
Acute	+		
Tense	+		+

(1b)

Segment	+		+ +
Vocalic	+		+
Consonantal		-->	
Flat	α		α
Tense	+		+

(1c)

Vocalic	+		+
Consonantal			
Compact	α	-->	β
Diffuse	β		$\bar{\alpha}$
Tense	+		+

3. In the light of later rules, possibly the underlying forms for the non-Compact non-Flat vowels should be symbolized i̱, e̱ instead of i̱, e̱.

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